

REMARKS

Claims 9-64 are pending in the application. Claims 11, 12, 14, 16, 19, 20, 23-28, 30 and 35-64 have been withdrawn from consideration as directed to either a non-elected invention (Claims 35-64) or directed to a non-elected species (Claims 11, 12, 14, 16, 19, 20, 23-28, and 30). Claims 9, 10, 13, 15, 17, 18, 21, 22, 29, and 31-34 have been rejected. Claims 29 and 31 have been amended. Claims 65-82 have been added. Claims 9-28, 30, and 35-64 have been canceled without acquiescence to the Examiner's rejection of these claims, without abandonment of the subject matter defined by these claims, or without prejudice to applicants to seek patent protection for the subject matter defined by these claims in an application for patent to be filed in the future. Reconsideration and allowance of Claims 29, 31-34, and 65-82 in view of the above amendments and following remarks is respectfully requested.

The Rejection of Claims 9, 10, 13, 15, 17, 18, 21, 22, 29, and 31-34

Under 35 U.S.C. § 112, First Paragraph

Claims 9, 10, 13, 15, 17, 18, 21, 22, 29, and 31-34 stand rejected under 35 U.S.C. § 112, first paragraph, on the grounds that the specification, while enabling for compounds disclosed with a disclosed π -electron donor groups, π -conjugate polyene bridge, and π -electron acceptor groups, does not reasonably provide enablement for all compounds claimed. The Examiner is of the opinion that the claims read on compounds that are neither disclosed nor contemplated by the specification. Withdrawal of the rejection is requested for the following reasons.

Claims 9, 10, 13, 15, 17, 18, 21, and 22 have been canceled.

Claim 29 has been amended and is an independent claim relating to a compound having a donor group conjugated to an acceptor group that includes a dihydrofuran group through a bridge group that includes a fused dithiophene group.

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Claim 31 is an independent claim relating to a compound having a donor group conjugated through a bridge group to an acceptor group having the recited dihydrofuran structure. Claims 32-34 depend from Claim 31 and recite specific substituents for the acceptor group.

Applicants submit that the specification enables the scope of independent Claims 29 and 31, and dependent Claims 32-34. The specification enables one skilled in the art to make and use chromophore compounds having a donor group conjugated to an acceptor group through a bridge group. The specification is replete with examples of donor groups, acceptor groups, and bridge groups, as well as synthetic methods and techniques for making chromophores having a donor group conjugated to an acceptor group through a bridge group. Moreover, the specification describes with particularity chromophores having a donor group conjugated to an acceptor group that includes a dihydrofuran group through a bridge group that includes a fused dithiophene group (Claim 29), and chromophores having a donor group conjugated through a bridge group to an acceptor group that includes the recited dihydrofuran group (Claims 31-34).

Regarding the compounds of Claim 29, the acceptor group is described at page 13, the bridge group is described at page 15. Methods for making these compounds are described in the application, for example, FIGURE 4 describes a general synthetic procedure for making compounds that include the fused dithiophene bridge, Example 2 provides a synthetic procedure for making a representative compound having the recited bridge and acceptor groups (see FIGURES 12 and 13), Example 7 provides a synthetic procedure for making a representative compound having a fused dithiophene bridge and dihydrofuran acceptor (see FIGURES 26 and 27), Example 10 provides a synthetic procedure for making a representative compound having a fused dithiophene bridge and dihydrofuran acceptor (see FIGURE 45), Example 11 provides a synthetic procedure for making a representative

compound having a fused dithiophene bridge and dihydrofuran acceptor (see FIGURE 46), Example 12 provides a synthetic procedure for making a representative compound having a fused dithiophene bridge and dihydrofuran acceptor (see FIGURE 47), and Example 13 provides a synthetic procedure for making a representative compound having a fused dithiophene bridge and dihydrofuran acceptor (see FIGURE 48).

Regarding the compounds of Claims 31-34, the acceptor group is described at page 13. Methods for making representative acceptors is described in Example 5 (see FIGURES 16 and 19). Methods for making compounds that include the acceptors are described throughout the application including in the examples and figures.

Because the specification provides a detailed description of how to make and use the compounds defined by Claims 29 and 31-34, the specification is enabling for the scope of these claims. Withdrawal of this grounds for rejection is respectfully requested.

The Rejection of Claims 9, 10, 13, 15, 17, 18, 21, 22, 29, and 31-34

Under 35 U.S.C. § 112, Second Paragraph

Claims 9, 10, 13, 15, 17, 18, 21, 22, 29, and 31-34 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. The Examiner states that it is unclear how the π -electron donor groups, π -conjugate polyene bridge, and π -electron acceptor groups are conjugated. The Examiner states that in Claims 15, 22, and 31-34, the definition of "R" as the rest of the compound is vague and indefinite. Withdrawal of the rejection is respectfully requested for the following reasons.

Claims 9, 10, 13, 15, 17, 18, 21, and 22 have been canceled.

Claim 31 has been amended by deleting reference to R and by deleting R from the recited structure.

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Applicants submit that the claims are definitive with regard to how the π -electron donor groups, bridge, and π -electron acceptor groups are conjugated. As used throughout the specification and claims, the term "conjugated" is used in its traditional organic chemical sense and refers to π -electron delocalization. The compounds of the present invention include delocalized π -electron systems that extend from the compounds' electron donor groups to the compounds' electron acceptor groups through the compounds' bridge groups by way of the π -electron system. In each and every one of the compounds of the invention, the donor group is conjugated to the acceptor group through the bridge group; that is, each compound has a π -electron system that is delocalized from the donor to the acceptor through the bridge. The extended π -electron system of these compounds results from the overlap of carbon p-type orbitals from the donor to the acceptor through the bridge. The extended π -electron system imparts these compounds with their high polarizability.

Claim 29 relates to such donor-bridge-acceptor compounds having a fused dithiophene group in the compounds' bridge component. Representative compounds having a fused dithiophene group in the bridge component are illustrated in FIGURES 12, 14, 21, 26, and 45-47. The extended π -electron systems of these compounds (i.e., their conjugation) also is readily apparent from these figures.

Claim 31 relates to donor-bridge-acceptor compounds having the recited dihydrofuran acceptor group. Claims 32-34 depend from Claim 31. Representative compounds having the recited dihydrofuran acceptor group are illustrated in FIGURES 1, 2, 15, 16, 17, 19, 21, and 47. Again, the extended π -electron systems of these compounds (i.e., their conjugation) is readily apparent from these figures.

Because the nature of the claimed compounds is clear with regard to their donor-bridge-acceptor components, and because Claim 29 relates to such compounds having a

specific bridge component (i.e., bridge includes a fused dithiophene group) and Claim 31 relates to such compounds having a specific acceptor component, the claimed invention is definite. Withdrawal of this grounds for rejection is respectfully requested.

The Rejection of Claims 9, 10, 13, 15, 17, and 18 Under 35 U.S.C. § 102(e)

Claims 9, 10, 13, 15, 17, and 18 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,067,186, issued to Dalton et al. Claims 9, 10, 13, 15, 17, and 18 have been canceled. Withdrawal of this grounds for rejection is respectfully requested.

The Rejection of Claims 9, 10, 13, 15, 17, and 18 Under 35 U.S.C. § 102(a)

Claims 9, 10, 13, 15, 17, and 18 stand rejected under 35 U.S.C. § 102(a) as being anticipated by WO 00/09613 (Pacific Wave). Claims 9, 10, 13, 15, 17, and 18 have been canceled. Withdrawal of this grounds for rejection is respectfully requested.

The Rejection of Claims 9, 10, 13, 15, 17, and 18 Under 35 U.S.C. § 102(b)

Claims 9, 10, 13, 15, 17, and 18 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,676,884, issued to Tiers et al. Claims 9, 10, 13, 15, 17, and 18 have been canceled. Withdrawal of this grounds for rejection is respectfully requested.

The Rejection of Claims 9, 13, 17, 21, and 29 Under 35 U.S.C. §§ 102(b)/103(a)

Claims 9, 13, 17, 21, and 29 stand rejected under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over U.S. Patent No. 5,514,799, issued to Varanasi et al. Withdrawal of the rejection is respectfully requested for the following reasons.

Claims 9, 13, 17, and 21 have been canceled.

As amended, Claim 29 is directed to a compound having a donor group conjugated to an acceptor group that includes a dihydrofuran group through a bridge group that includes a fused dithiophene group.

The Varanasi reference describes 1,1-disubstituted vinyl nonlinear optical materials. These materials include compounds having an electron withdrawing moiety conjugated to an electron donating moiety. Examples 14 and 15 of the reference depict compounds in which the electron donating moiety (dithiane) is conjugated to an electron withdrawing moiety (tricyanovinyl) through a fused dithiophene group.

The cited reference differs from the invention as now claimed because the cited reference fails to describe a compound that includes a fused dithiophene bridge and a dihydrofuran acceptor.

Because the cited references fails to exactly describe the claimed invention, the reference is not anticipatory. Withdrawal of this grounds for rejection is respectfully requested.

The cited reference fails to teach, suggest, provide any motivation to make, or otherwise render obvious the invention as now claimed. Electron withdrawing groups described in the reference include nitro, cyano, formyl, keto, ester, phosphate ester, phosphite ester, sulfonate ester, and sulfinatate ester groups, N,N-dialkylbarbituric acids, N,N-dialkylthiobarbituric acids, rhodamines, hydantoins, oxazolines, 3-cyanovinylindane-1-sulfone, 1,3-bis-sulfonylindane, indane-1,3-dione, 3-dicyanovinylindane-1-one, and 1,3-bisdicyanovinylindane. The reference fails to teach or suggest a dihydrofuran group as an electron withdrawing group (i.e., acceptor).

Because the cited reference fails to teach, suggest, provide any motivation to make, or otherwise render obvious the invention as claimed, the claimed invention is nonobvious and patentable over the cited references. Withdrawal of this grounds for rejection is respectfully requested.

The Rejection of Claims 18 and 22 Under 35 U.S.C. § 103(a)

Claims 18 and 22 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,514,799, issued to Varanasi et al., in view of U.S. Patent No. 5,432,286, issued

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to Cabrera et al. Claims 18 and 22 have been canceled. Withdrawal of this grounds for rejection is respectfully requested.

Allowable Subject Matter

The indication of allowable subject matter is noted with appreciation. The Examiner states that claims limited to the elected species are deemed allowable and notes, for example, the compounds of FIGURES 21 and 47. For the same reasons as noted by the Examiner, applicants believe that the compounds illustrated in FIGURES 26, 45, and 46 are also allowable. Claims 70-73 have been added directed to these species.

New Claims 65-69

Claims 65-69 have been added. Claims 65-69 depend from Claim 31 and recite specific substituents for the acceptor. Support for the subject matter of the new claims can be found throughout the specification as originally filed.

New Claims 74-82

Claims 74-82 have been added. Claims 75-82 depend from Claim 74. Claim 74 is directed to a substituent that is useful as an electron acceptor group in nonlinear optical materials. Claim 74 recites the same structure as recited in Claim 31. Support for the subject matter of the new claims can be found throughout the specification as originally filed.

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CONCLUSION

In view of the above amendments and foregoing remarks, applicants believe that Claims 29, 31-34, and 65-82 are in condition for allowance. If any issues remain that may be expeditiously addressed in a telephone interview, the Examiner is encouraged to telephone applicants' attorney at 206.695.1755.

Respectfully submitted,

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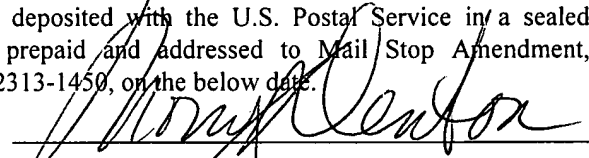


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